COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

STEPHEN R. PRITCHARD
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

MEMORANDUM

By: Jack Miano, Environmental Engineer, BWSC, Audit Branch
To: John Carrigan, Chief, Solid Waste Branch
Subject: Crow Lane Landfill, Ambient Air & Landfill Gas Sampling, Evaluation of Tentatively Identified Compounds
Date: May 12, 2006

SAMPLING LOCATIONS

Ambient Air Samples AMB-1, AMB-2, AMB-3
Landfill Gas Samples, EW-1, TEW-2, Flare Inlet

ANALYTICAL TECHNIQUE

Whole air grab samples using SUMMA canisters
Analysis by EPA Method TO-15, GCMS
Instrument calibration for a standard list of 64 VOCs
Tentatively Identified Compounds (TICS) identification, w/ electronic library search
In general, the detection limits for the target analytes and the TICs were in the 2 ug/m^3 range.

ANALYTICAL RESULTS

TICs were not identified in the ambient air samples AMB-1, AMB-2 or AMB-3. TICs were identified in the landfill gas samples EW-1, TEW-2 and Inlet Flare. The 10 TICs in each sample with the highest estimated concentrations were tabulated in the sampling report. There were more TICs in addition to those that were tabulated in the landfill gas samples.

The target analytes and the TICs found in the landfill gas samples can be separated into several source/type categories. These categories include petroleum, industrial solvents, natural and breakdown products, and refrigeration compounds. Most TICs were reported as the best match compound indicated by the electronic library search. A few TICs did not have good library matches and were reported as unknowns. The mass spectra for these unknown TICs were reviewed and they appear to be breakdown products of petroleum compounds. The TICs that

were not tabulated also appear to be mostly petroleum compounds and breakdown products of petroleum compounds, including a combination of aliphatic and cyclic substituted petroleum compounds.

Two of the TICS are pinenes, which are natural products originating from coniferous trees. In industry, pinenes are refined from gum turpentine and are used in many products including fragrance and insecticide applications (Molecular Structure = C10H16, Moleculat weight = 136). It's origin may be natural or industrial.

The review of the data did not suggest that more sampling is necessary with respect to TICs.

RISK ASSESSMENT RECOMMENDATION

The TICs, including the "unknown" TICs, are primarily petroleum compounds and petroleum breakdown products derived from degradation and weathering. If these TICs are to be included in a human health risk assessment, it would be reasonably conservative to sum their estimated concentrations, and assume they have the same toxicity as the APH petroleum fraction C9-C11 Aromatic Hydrocarbons, as some of these TICs (substituted benzenes) have aromatic structure. The pinenes may use the same APH fraction as a surrogate for toxicity assessment as they too are aromatic in structure.

TABLE SUMMARY OF UNKNOWN TICS IN THE LANDFILL GAS SAMPLES
EW-1, 10 TICs, LABID 06-061-4 2 Unknown TICs, 12.87, possible nitrogen compound such as insecticide, or petroleum 25.22, petroleum compound
TEW-2, 10 TICs, LABID 06-061-5 4 Unknown TICs, 27.83, cyclic petroleum compound 28.35, cyclic petroleum compound 28.69, cyclic ketone 29.64, substituted cyclohexane petroleum
Flare Inlet, 10 TICs, LABID 06-061-6 1 Unknown TIC, 27.88, substituted cyclohexane petroleum

Target Compound and Tentatively Identified Compound Source Categorization

TARGET ANALYTES	TICS
PETROLEUM benzene 3-chloropropene n-hexane cyclohexane 2,2,4-trimethylpentane n-heptane toluene ethylbenzene xylenes styrene 4-ethyl-toluene 1,3,5-trimethylbenzene 1,2,4-trimethylbenzene	PETROLEUM Unknown C8-H16 hydrocarbon Unknown C9-H18 hydrocarbon unknown aliphatic hydrocarbon 1,1,3-triethylbenzene 3-methyl-octane n-nonane 2,6-dimethyloctane methyl-cyclohexane propyl-cyclohexane 1,2,3-trimethylbenzene decane
INDUSTRIAL SOLVENTS Trichloroethene 1,1,2-trichloroethane tetrachloroethene chlorobenzene styrene 1,4-dichlorobenzene tetrahydrofuran	INDUSTRIAL SOLVENTS alpha-pinene beta pinene
ORGANIC COMPOUND BREAKDOWN & FORMATION Acetone 2-butanone methyl-isobutyl-ketone	ORGANIC COMPOUND BREAKDOWN & FORMATION POSSIBLY NATURAL alpha-pinene beta pinene
REFRIGERATION Trichlorofluoromethane 1900	